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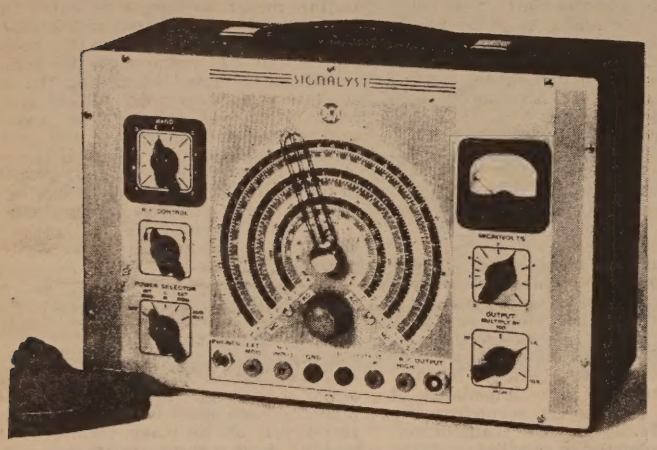
THE HORN SPEAKER

MEET IN ATLANTA

There is no official information but there is word of activities for radio collectors on May 1 and 2 in Atlanta, Georgia. For more information write; Larry Flegle, 8825 Roswell Roads, Suite 475, Atlanta, Georgia 30338.

How to Make Receiver Measurements . . .

by
GUY DEXTER
Baltimore, Maryland.



Prime pre-requisite—A good signal generator!

The nearest thing to a bottle-neck is in receiver aligners! Learn that

Here is a good article about those art deco designed test instruments of the late 30's and early 40's. Also Dexter gives a good discussion of early receiver design.

IT is hard to believe that among men actually engaged in radio receiver work, there is an appalling lack of knowledge regarding performance measurements. Nevertheless, this is the sad truth. It seldom occurs to the average serviceman that a real performance check would reveal whether he was getting to first base or not with his repairs and adjustments. Generally, it is lack of information on his own part—a defective part is replaced, or the stages are realigned, and so the set should be operating as the manufacturer intended. Just like that!

A radio man knows nothing about a receiver until he has checked its performance. The ear is not a measuring instrument, nor is the receiver dial. The mere fact that the dial calibration looks passable and that all extraneous noises have been eliminated does not positively indicate that a receiver is operating at peak efficiency. There may still be defective parts that could stand replacing. Tubes that give a reasonably good account of themselves in tube checkers might be discarded if the gain of the receiver stage in which they are employed, rather than the tube checker, is made the yardstick. A coupling transformer may pass all of the conventional service checks, yet show up as defective in a good fidelity test. Side-band cutting in a too-sharply peaked i.f. channel, uncovered quickly in an overall fidelity check, will render any receiver *sour* to a lover of well-rounded music. The writer might go on for an hour listing topics. There is a real art to the business of restoring a receiver to its original (or better) operating standard, and performance checking is the science behind that art. Indeed, brethren, there is more to receiver adjustment than the alignment alone.

Because complete information on receiver performance measurements is, for the most part, so scattered through a number of textbooks, it has not reached large percentages of the trade. Generally, it is something that is learned in a hand-to-mouth manner over a long period of practice. And when the last detail is finally mastered, the technician looks back down the corridors of time and opines that he might have done a much better job all along and perhaps made more money had he had the information from the very start. The men who earn their bread in receiver-factory test laboratories have to know performance measurements and be able to make them quickly and completely, otherwise their presence on the job becomes a matter of ancient history. New applicants for such jobs (and they pay well!) are questioned closely as to their knowledge of the subject.

The serviceman who would expand his scope of activity to include communications receivers must be equipped to make performance measurements as regular routine if he would cash in on this profitable business. Certainly, the technician who builds receivers of any circuit-type, for any field of application, must be similarly equipped if he would stay in business long.

Scope of Measurements

In order completely to determine receiver performance, the following characteristics must be measured in *quantitative* terms:

Sensitivity. This is a measure of the ability of the receiver to respond fully to weak signals. The lower the signal voltage which will deliver maximum undistorted power output to the speaker, the more sensitive is the receiver. A practical point of view is that the insensitive receiver will not respond satisfactorily to any but strong broadcast carriers. Sensitivity is an important receiver property, whether the equipment is of the communication, broadcast, or experimental class. The sensitivity test can, like other performance measurements, serve to show up defective circuit components and poor design.

Selectivity. The ability of a receiver to reject all unwanted signals when it is tuned to a desired signal is as important to the owner of a home broadcast receiver as to the professional radio operator. All operators of receivers desire that their sets be capable of operation within a few kilocycles of an undesired signal without interference. It is the ability of the tuned circuits to admit only the desired signal that is termed *selectivity.* Selectivity measurements will reveal a number of circuit troubles, as well as such poor-design features as overcoupling and high-resistance coils.

Channel Gain. This property is somewhat comparable to sensitivity. It is the purpose of a vacuum tube to provide amplification (step-up, or gain) and it is used for that purpose in conjunction with transformers or similar coupling media. Each stage of each channel (R. F., I. F., Converter, and A. F.) has as one of its jobs the function of gain, and the efficiency with which it does this job is a measure of the perfection of parts, tubes, and design. Gain measurements are made on separate stages and on an entire channel, embracing all of its stages. The measurement of gain is most important in receiver procedure. There are many advantages in so checking stages and channels in trouble diagnosis, as well as in receiver studies.

Fidelity. This term, lately loosely handled to a great extent by the general public, refers to the degree to which the receiver reproduces the sounds which were sent into the broadcast microphone. Fidelity, as the definition would assign, refers to *faithfulness* of reproduction. The radio listener expects a trumpet to sound like a trumpet, does not expect the bass drum to be cut out of the program by his own receiver, or the high notes of the violin to be obliterated. For checking this receiver characteristic, the radio man has the equivalent of a miniature broadcast station and all of the instruments and voices known to man. For indeed that analogy is fulfilled by his r.f. signal generator when it is modulated by his variable-frequency audio oscillator. Fidelity checks are made in the audio stages and speaker, i.f. channel, and entire receiver. Overemphasis of certain notes is checked in the course of this measurement and laid at the door of the speaker, chassis, cabinet, or any other part found to be resonating.

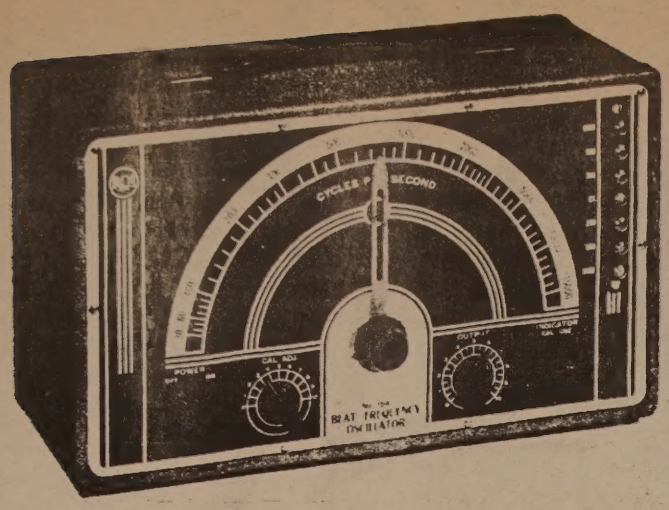
Noise Ratio. The actual level of the signal above the residual set noise is of paramount importance. To the communications operator, the signal-to-noise ratio is a quantitative indication of quiet operation. To the home set owner, who knows nothing about the ratio and cares less, the presence of a high noise level between station carriers is a distinct nuisance. Detection of an unreasonably high noise level can lead to direct spotting and remedying of the trouble.

Image Ratio. Image signals from the air, or repeat points produced by image settings of the high-frequency oscillator in a superheterodyne receiver run a close second in nuisance value to interference arising from poor selectivity. A complete receiver performance test includes an actual measurement of the ratio of signal to image. After spotting a high ratio, the serviceman is seldom able to rectify the difficulty, since it is most frequently a result of design; however, he can, when the customer approves, add sufficient r.f. amplifier stages (two are sufficient; one helpful) to attenuate the image response. In extreme cases, he might even be authorized to change the intermediate frequency to a higher value for the same purpose. But, of course, this latter procedure involves redesign of the coils of the r.f. section as well.

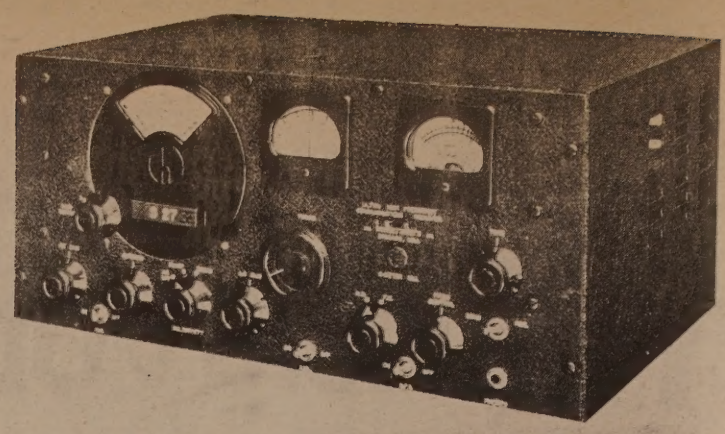
Instruments

The instruments used in complete receiver measurements are those which are to be found in any up to date shop or lab. They are a signal generator with calibrated output voltage indicator and attenuator and with provision for external modulation; a variable-frequency audio oscillator, covering the range extending from 20 cycles to 15 kilocycles; a suitable a.c. voltmeter with good frequency response, preferably a vacuum-tube voltmeter (but a high-quality copper-oxide type instrument will suffice); and suitable power load resistors to match the receiver output if the speaker is not obtainable.

The signal generator must be an all-wave instrument to be useful for the measurements required in r.f. and i.f. channels, and must be provided with suitable impedance-matching devices for coupling into the receiver. Of many *excellent* instruments, now available to the serviceman, is the *RCA Signalyst.* This signal generator delivers a maximum of 0.2 volt r.m.s.



Second prime requisite—An excellent audio signal generator!



One of the many types of receivers, the author describes testing.

(or greater) of calibrated r.f. voltage between 100 kc. and 120 Mc. with very good accuracy. It was used by the writer, together with a variable-frequency audio oscillator in collecting data for this article. A built-in vacuum-tube voltmeter, in conjunction with a calibrated attenuator, gives an accurate indication of the r.f. voltage applied to the test points of the receiver circuit. The instrument is modulated internally at 400 cycles per second, or may be externally modulated by the variable-frequency audio oscillator in fidelity measurements, as will be explained later. The fact that the frequencies are delivered at an accuracy of plus or minus 1 per cent on *fundamentals* as high as 120 Mc. renders the instrument invaluable for i.f., broadcast-band, short-wave, and ultra-short-wave measurements.

The variable-frequency audio oscillator must be capable of covering the a.f. spectrum mentioned in the opening paragraph of this section, its output voltage (controllable by a suitable built-in attenuator) must be of good waveform, and its output circuit must afford a number of selectable impedances for matching to the r.f. signal generator and various points in the receiver audio circuits. Of many oscillators meeting these specifications, one is the *RCA Type 154 Beat Frequency Oscillator.*

The a.c. voltmeter is used to indicate receiver a.f. power output and to monitor the voltage output of the audio oscillator. Since fidelity measurements are made at various frequencies throughout the audio range, it is essential that the frequency error of this meter be very low. For this reason, a vacuum-tube voltmeter is most desirable. However, there are available a few copper-oxide rectifier meters with good frequency characteristics which will be suitable for this application. They are considerably more expensive than a simple, though adequate, V-T voltmeter which might be constructed by the radio man.

All output measurements are made with the receiver output-amplifier tube (or output transformer) properly terminated. Generally, the speaker will be found permanently connected-in with the receiver circuit. But when this is not the case, the output circuit must be connected to a load resistor equivalent in d.c. ohmic value to the recommended load impedance of the amplifier tube (or to the secondary impedance, when an output transformer is included on the receiver chassis). The a.c. voltage developed across the speaker input terminals, or across the load resistor (which acts as a speaker substitute) by the input signal is then measured, and the power output wattage determined from the equation: $P = E^2/R$; where P is the audio power output in watts, E the measured a.c. volts, and R the load resistance (or impedance) in ohms. If a load resistor is used in the measurement of power output, it must be capable of handling at least *twice* the maximum a.f. power output normally delivered by the audio amplifier stage.

How to Make the Measurements

Before entering into the actual measurements of receiver performance, first align the receiver carefully throughout, peaking all trimmers and padders "on the nose" unless the alignment instructions prescribe staggered alignment in certain stages. Inspect the tuning dial calibration on all frequency ranges, correcting any irregularities that may appear. In short, make certain that the receiver is "doing its level best." It is assumed, of course, that all noises, intermittents, and the like have been completely "serviced out."

You are now ready to look into the receiver's actual performance, and after making the various tests might be acutely surprised to discover that your job of servicing has not been as complete as you might have at first guaranteed. You are going to learn one of these things:

(1) that, fortunately, the receiver is in A-1 operating condition;

(2) that stage gain is low, fidelity poor, or noise level high, and that by correcting these faults you can give the set that final "shot in the arm" that will completely revitalize it, to your customer's delight; or

(3) that the set was poorly designed from the very start and that there is little you can do to improve matters save revamping the circuit in many places. You will now be more of an engineer or skilled technician than you have ever been before.

Sensitivity Tests

Sensitivity. You may make this measurement on any type of receiver, but the chances are that the bulk of your jobs are going to be done on tuned r.f. and superhet jobs, with the latter far out in front. Make the sensitivity test first.

1. With the receiver operating in the broadcast band (tuned to the extreme low-frequency—550-kc.—end of the dial), couple the signal generator to the antenna and ground terminals through a suitable dummy antenna, or other impedance-matching device. (The better signal generators include in their supplied accessories such matching devices,

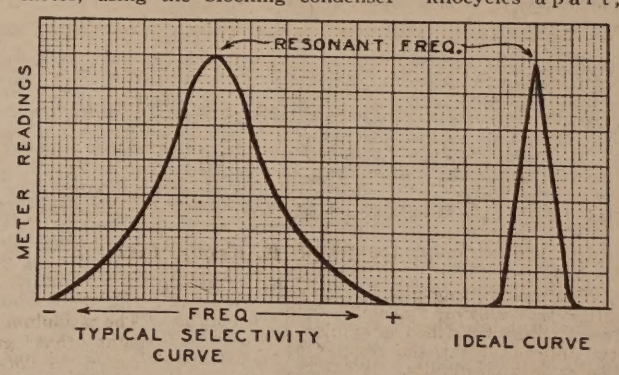
2. Connect the a.c. voltmeter, set to a voltage range sufficiently high to accommodate the expected power output, to the output terminals. If the speaker is left connected to the receiver, the meter may be connected directly across the primary or secondary winding of the output transformer. If the primary connection is used, a blocking condenser of 0.25 mfd. capacitance will have to be inserted in one voltmeter lead to block the d.c. plate-circuit voltage component. If the speaker is not used, the load resistor, chosen in ohmage to match the plate impedance of the output tube or the secondary impedance of the output transformer, must be connected in parallel with the meter, using the blocking condenser just referred to if connection is made directly to the plate terminal,

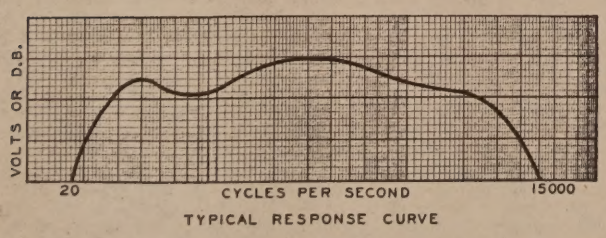
3. Switch on the signal generator, set its frequency dial to the frequency to which the receiver is tuned, and set its modulation switch for internal modulation. Carefully tune-in the generator signal with the receiver dial, watching for the peak reading of the output meter, preferably with the a.v.c. of the receiver switched off. Adjust the receiver gain control (s) to the proper setting to prevent overloading and "plugging,"

4. Slowly and carefully vary the output voltage delivered by the signal generator by adjusting its fine and coarse attenuators, stopping when the output meter indicates the rated full undistorted power output indicated by the set manufacturer. At this point, the actual r.f. voltage of the signal generator is noted by taking the attenuator and generator VTVM readings. This e.m.f. will be in microvolts and is the figure indicating the *sensitivity* of the receiver. Thus, if the receiver is guaranteed to deliver 2 watts of undistorted audio output power, and this amount of power is obtained when a signal of 10 microvolts is applied to the antenna and ground terminals, the sensitivity of the receiver is *10 microvolts.* Good-grade receivers, such as high-priced communications sets, will generally be found to possess better than 1 microvolt sensitivity,

5. Repeat the sensitivity measurement at 800, 1200, and 1500 kc. and again at the high-, low-, and mid-scale points of each short-wave range, if the receiver is an all-wave receiver. By making these measurements every few kilocycles apart, a curve may be drawn, plotting microvolts against dial settings, to show the variation of sensitivity with frequency.

(Continued on page 4)





TYPICAL RESPONSE CURVE

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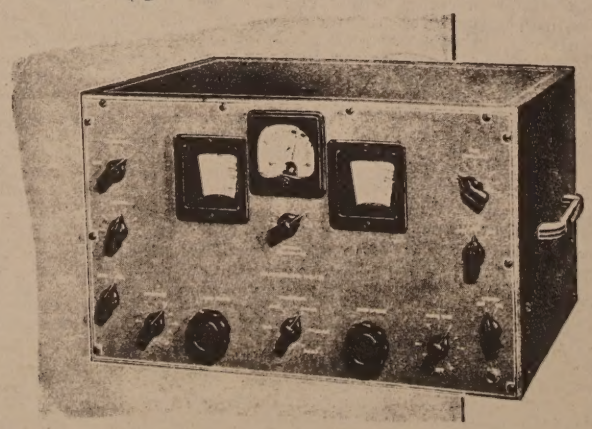
RADIO NEWS



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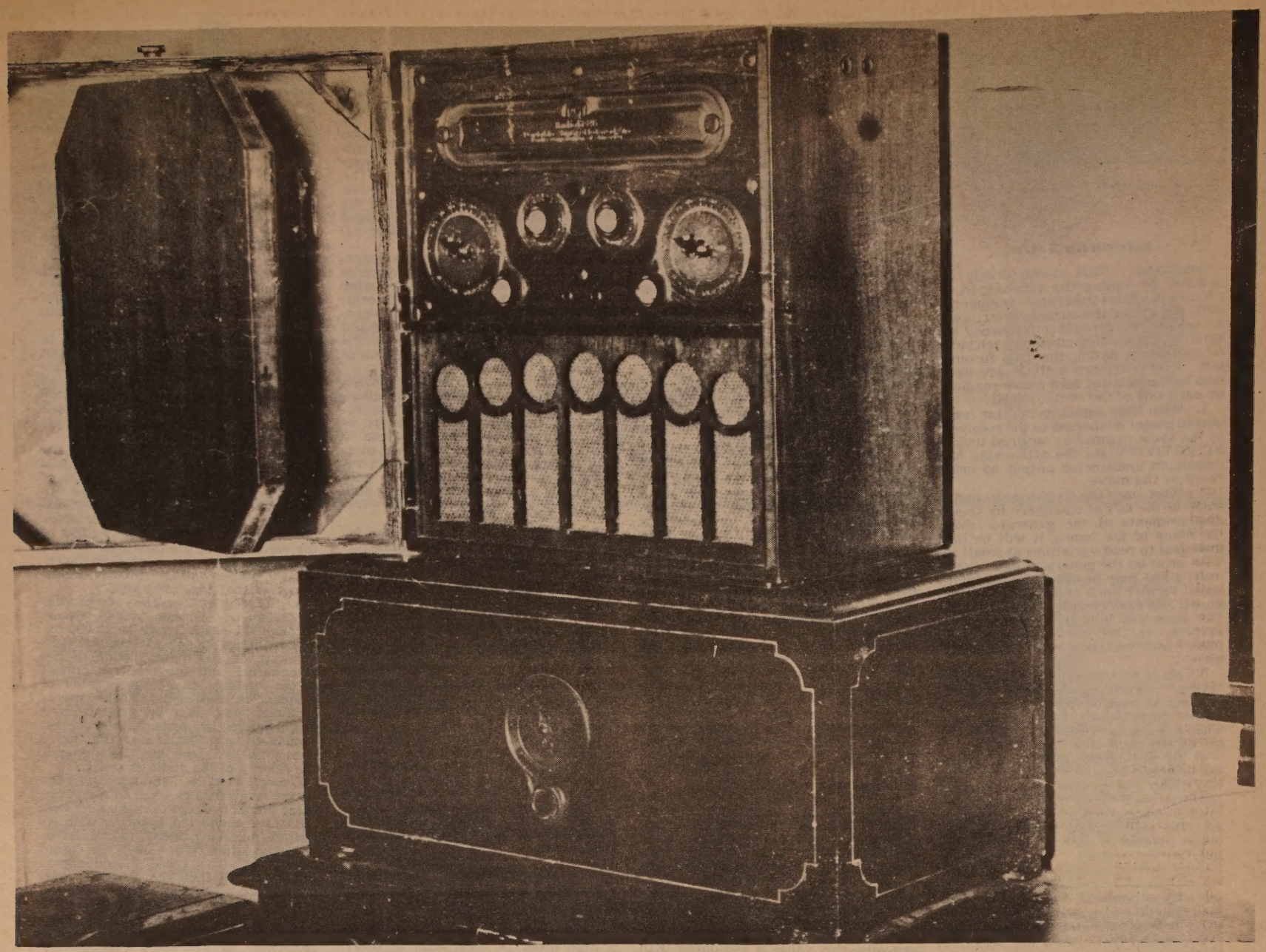
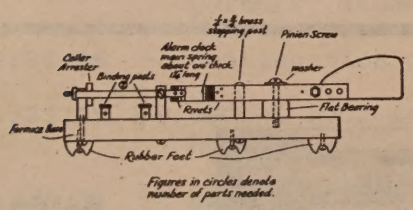


Radiola 26, the well known 1925 portable that was so often used for locating interference was extremely compact for its day. This radio included a loud speaker, batteries and a rotable loop antenna that comprises part of one door. A "home battery box" is used for somewhat economical operation at a fixed post. Back in 1925 the whole unit sold for $225. One of the "price guiders" lists it at $300. collector's value.

Making Your Own Bug

By Ralph E. Kepler, 8OT

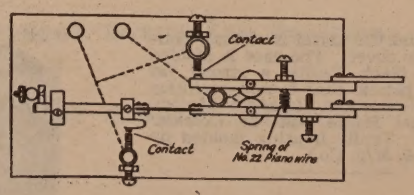
HEREWITH the long-promised semi-automatic sending machine dope. The machine described is similar to, yet vastly different from, the regular bug as used on telegraph circuits. It has been



used on a "fast" bonus wire by myself for a period of about 6 months, and by several other operators on faster circuits. The main reason for this peculiar looking piece of machinery is the defeat of cost. I am at present using the bug at 8OT and can find no difference in signals between it and a regular factory-built bug.

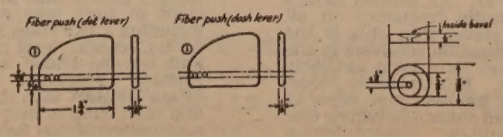
The sketches are almost self-explanatory, and the dimensions are not at all critical. That is, they do not have to be lived up to in utmost detail.

The pendulum spring and weight that govern the speed of the dots deserve a word or two. The spring must be firm, and vibrate with not too much lag after pressing of the dot-push. The weight should be made so

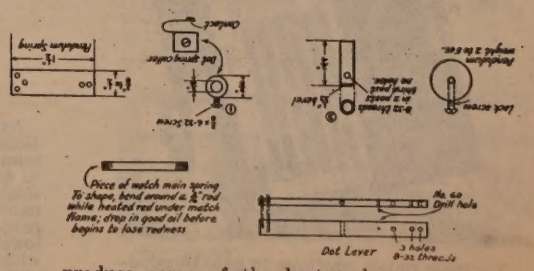


------ WIRING

that it will not allow the pendulum to make over 40 dots without beginning to die out, nor less than 20 or 25 dots before dying out. To adjust the dot-contact, press the dot-push and move the contact screw in until it just touches the dot contact spring. Here it should be locked. The rest of the machine to be adjusted to the operators' touch.



(Please, if you make one of these speed keys, do not learn how to use it by putting it on the air. One of these automatic keys can make more hash out of a good International Morse than a three-year-old with St. Vitus dance, if the operator does not know how to use it. Practice with the thing with a buzzer and battery, in some hole where you will not bother a single person; and don't take it out of there for use on your transmitter until you are certain that you can send as well and about as slowly as on your regular key. Then no one will revile you for using a "bug" key, but will bless you; for the "bug" key can



produce some of the best code you ever heard if *properly* handled.—Ed.)

QST January 1925

Correct Receiver Measurements

Selectivity Tests

Selectivity. This characteristic is checked by tuning the receiver to a chosen signal-generator frequency with the aid of the output meter; and by setting the generator frequency in small corresponding steps on each side of resonance, noting the drop in output. The frequency settings are carried to the point of zero meter reading on each side of the center signal:

1. With the signal generator and output meter connected to the receiver in the same manner as outlined under SENSITIVITY, set the attenuator for maximum undistorted output as indicated by the meter,

2. First, vary the frequency in small steps to the *left* of resonance by small displacements of the generator dial. On many of the bands, it will be impractical to read variations as small as 1 kc. or so on the generator dial; however, a line may be drawn on the high-speed vernier knob and another on the panel, and each complete revolution of this knob (as indicated by successive arrivals of the lines opposite each other) may be taken as one frequency step,

3. Make enough separate frequency "steps," recording the output-meter reading at each step, to take the receiver output down to absolute zero. Then repeat the entire stepping process on the *right* side of resonance,

4. By noting the number of times the inscribed indicator lines on the vernier knob and generator panel come opposite each other between two known graduations on the generator dial, the approximate number of kilocycles covered by each knob revolution may be determined. Plot these frequency variations against the recorded output-meter readings to obtain a *selectivity curve,* such as is shown. Remember that the sharper the top of this curve and the shorter the distance between its "feet," the more selective is the receiver,

5. If the signal generator has provision for external frequency modulation, the curve may be obtained instantaneously. A suitable frequency modulator *(wobbulator)* is connected to the F-M terminals of the generator, and a calibrated and properly synchronized oscilloscope connected with its vertical amplifier input in the second-detector circuit of the receiver. When using this system, the receiver and signal generator may be left tuned to a single dial frequency and the operator will not be required to "step" the generator dial to secure the curve points. The frequency modulator automatically sweeps the generator frequency back and forth on each side of the indicated signal frequency, and the corresponding selectivity curve appears at once on the calibrated 'scope screen.

6. Using either the manual or oscillographic method, selectivity measurements may be repeated at as many signal frequencies throughout the range of the receiver as the operator desires or the condition of the set would seem to demand.

I. F. Gain Tests

I. F. Gain. The gain of the intermediate-frequency channel may now be inspected by performing the following operations:

1. With the output meter connected to the receiver, as in the last operations, the signal generator is set to deliver signal voltage at the receiver's intermediate frequency. The "high" lead from the generator is connected to the grid terminal of the first detector and the other lead to ground. The normal circuit connection to the detector grid is left undisturbed,

2. A modulated i.f. signal is applied to the first-detector grid and the attenuator adjusted until the output meter reads the rated undistorted audio power output of the receiver. The microvoltage required to produce this amount of audio output is then read from the attenuator and recorded,

3. The generator "high" lead is then transferred to the grid terminal of the first i.f. tube, the normal grid-circuit wiring of the set being left undisturbed, and the generator output voltage increased by advancing the attenuator until the output meter gives the same reading as before. This microvoltage at this point is also recorded. And the ratio of the last attenuator reading to the first obtained will give information regarding the gain of the first i.f. stage. For example; if the reading obtained from the first detector operation is 10 microvolts and the reading from the second 100 microvolts, the stage gain is 10,

4. The "high" lead is then transferred to the grid terminal of the second i.f. tube and the attentuator advanced to restore the output-meter reading obtained in the previous operations. This new attenuator reading is noted, and the gain of the last i.f. stage determined from this reading and the microvolt reading taken in the previous operation. For example; if the last reading obtained was 500 microvolts, this value is compared with the microvoltage of 100 obtained from the operation immediately preceding. Here the stage gain for the last i.f. would be 5.

R. F. Gain Tests

R. F. Gain. The individual radio-frequency amplifier stages, if these are included in the receiver, may be inspected as follows:

1. The output meter is left connected as in the previous operations,

2. The signal-generator leads are then transferred; the "high"one being connected to the first detector tube's grid terminal and the other to ground. The normal circuit connections to the tube grid are left undisturbed,

3. Both receiver and signal generator are tuned to some desirable frequency, and the attenuator is adjusted until a signal level is reached where the output meter indicates full rated power output. The microvoltage level of the signal is then read from the attenuator and the reading recorded,

4. The "high" lead from the generator is then transferred to the grid terminal of the second r.f. tube, the normal circuit connection to that tube being left undisturbed, and the attenuator backed down to restore the original reading of the output meter. The reading of the attenuator at this point is likewise noted. And the ratio of the latter reading to the one first obtained will indicate the gain of the 2nd r.f. stage,

5. The "high" lead from the generator is then transferred to the receiver antenna terminal and the attenuator again backed down to restore the original output-meter reading, the microvoltage at this point being noted and compared with that obtained at the 2nd r.f. grid to obtain an expression of the gain of the 1st i.f. stage.

6. These r.f. gain measurements may be repeated at as many frequencies throughout the range of the receiver as the operator may desire or the condition of the set may seem to warrant. A graph may be drawn, plotting arbitrary gain figures against frequencies, to show deficiencies in gain at various settings of the receiver dial.

Image Ratio Tests

Image Ratio. A poor signal-to-image ratio can cause considerable difficulty in superhet reception. Short-wave receivers, in particular, should be checked for this characteristic:

1. With the output meter connected as in previous operations, set both signal generator and receiver to some desirable frequency,

2. Couple the generator to the antenna and ground terminals of the receiver and adjust the attenuator until the modulated input signal causes a full undistorted power-output deflection of the output meter,

3. Now, leaving the receiver dial undisturbed, set the generator to a frequency removed from the original frequency by twice the intermediate frequency of the receiver, and note the reading of the output meter at this point. The two meter readings thus obtained will express the signal-to-image ratio.

Noise Ratio Tests

Noise Ratio. Noise, due largely to shot effect in tubes and electron action in conductors, is generally of negligible level in broadcast receivers but of a high order of magnitude in short-wave sets employing r.f. amplification. However, excessive noise in either type of receiver may be an indication of faulty tubes or circuit components. The noise level with respect to maximum output may be checked in this manner:

1. All connections are made as indicated under the directions for measuring the image ratio,

2. The receiver and signal generator are tuned to some desirable frequency, the attenuator being set so that the receiver delivers maximum undistorted power output to the meter circuit,

3. The generator is then disconnected entirely from the receiver, leaving all settings of the receiver undisturbed, and the reading of the output meter noted. Any reading of the meter will then be due to noise or hum level, as distinguished by a listening test. It will in all probability be necessary to switch to one of the low ranges of the output meter to obtain a satisfactory reading. The voltage or power reading of the meter at maximum signal output and the reading at noise output alone will together give the noise (or hum) ratio.

Fidelity Tests

A.F. Channel Fidelity. The ability of the receiver to reproduce all tones within the range of hearing faithfully may be checked by separate inspections of the audio channel, the i.f. channel, and entire receiver:

1. For a check of the audio channel, the audio oscillator is coupled to the grid of the first audio tube, the output meter being connected as in previous operations,

2. A second a.c. voltmeter must be connected in parallel with the output of the audio oscillator to show the output voltage of that instrument at all times. This meter should have a good frequency characteristic and would preferably be a vacuum-tube volt-meter,

3. At a setting of 1000 cycles on the audio oscillator, the oscillator signal voltage level is adjusted by means of the attenuator on that instrument until the output meter in the receiver circuit reads maximum undistorted power output. The voltage reading of the meter across the oscillator is then noted carefully, since hereafter the oscillator output voltage must be maintained at that constant value,

4. Starting at 20 cycles, the oscillator frequency is then slowly varied through the entire range to 15,000 cycles or higher (keeping its output voltage constant by manipulation of the attenuator) and the receiver output meter readings at a large number of frequencies recorded. These meter readings may then be plotted in a graph against frequencies, to give a response curve. The nearer this curve is to a flat, straight line, the higher is the fidelity of the audio channel.

Overall Fidelity. The fidelity of the entire receiver is checked in much the same manner except that the audio oscillator is connected, together with its output-indicating meter, to the *external modulation* terminals of the signal generator. The receiver and signal generator are then tuned to some desirable frequency "on the nose"; and, keeping the microvolts input to the receiver at the level necessary for maximum undistorted receiver output, the frequency of the audio oscillator is carried from 20 cycles to 15,000 cycles or higher. At each of a number of a.f. settings, the readings of the receiver output meter are noted and data taken for a curve such as shown in figure 4. The voltage delivered by the audio oscillator must be that value recommended by the manufacturer of the signal generator for 30% modulation.

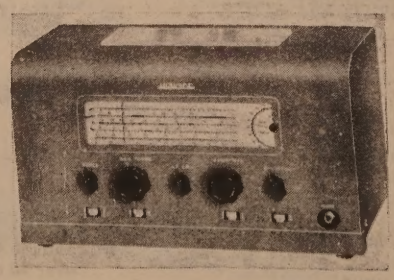
The fidelity of the i.f. channel may also be inspected with an apparatus set-up similar to that just described, but with the signal generator tuned to the intermediate frequency and coupled to the grid terminal of the first-detector tube. Such an inspection will very rapidly show up side-band "slicing" in the i.f. amplifier.

The measurements described in this article are well known to all men who perform engineering tests on communications receivers. They should be added to the knowledge applied daily by the serviceman. —30—

GM Portable Radio

Portable radios continue to gain in popularity. This new *GM* model is small, compact and simple to operate. An automatic switch turns it on when the case is opened, and the aerial is cleverly concealed in the cover. The case is molded of lustrous black Tenite, a strong yet lightweight plastic that is non-corrosive and weather-resistant. (*General Motors'* New Personal Radio built by *Colonial Radio Corp.* Tenite housing molded by *Sinko Tool & Mfg. Co.*)

New Howard Communication Receivers. *Howard* announces a new line of communication receivers, tuning from 550 KC to 43 MC (545 to 7). All models have a stage of tuned radio frequency on all bands. *Howard* states that this is the first time communication receivers in the lower price bracket have been available with this feature. Illustrated is Model "435-A," with an amateur net price of $29.95, having seven tubes (including rectifier) and a built-in *Howard-Jensen* speaker. The seven tube model is designed so that it can be returned to the factory at any time and changed into an eight or nine tube model. Accessories, including a two stage preamplifier, monitor and carrier level meter, are available and can be added at any time. This *Howard* Progressive Series permit the "Ham" to start with the seven tube model and then build in easy stages until he has a complete fifteen tube receiving station.

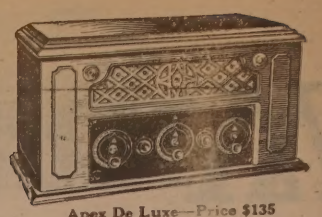


RADIO NEWS

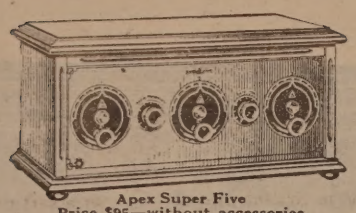
May, 1941

Apex
Entertainer
Price $22.50

Apex Baby
Grand Console
Price $225



Apex De Luxe—Price $135



Apex Super Five
Price $95—without accessories

1925 original prices

Apex
Console
Entertainer
Price $27.50

Apex Utility
Radio Table
Price $75

SOCIAL EVENTS

INDIANA HISTORICAL RADIO SOCIETY AND ANTIQUE WIRELESS ASSOCIATION

REGIONAL SPRING MEET - SATURDAY, MAY 2, 1987, at the

AUBURN-CORD-DUSENBERG MUSEUM IN AUBURN, INDIANA

FRIDAY, MAY 1

4:00 PM - Early Registration at the Museum.
7:00 PM - "Old Tyme Movie," AWA Show.

SATURDAY, MAY 2

9:00 AM - Registration at the Museum.
SWAP MEET IN THE NORTH PARKING LOT.

9:30 AM - Register Items for the OLD EQUIPMENT CONTEST.

10:00 AM - Register Items for the AFTERNOON AUCTION.
All items must be registered by 12:00 Noon.
You are invited to bring donated items for the IHRS Museum Fund, as well as personal sales.

10:30 AM - CONTEST JUDGING. Best of the show receives the GREBE TROPHY.

12:00 Noon - LUNCH at the Museum "Filling Station."

1:00 PM - AUCTION OF PERSONAL AND DONATED ITEMS. A 10% donation to the IHRS Museum Fund is expected on personal items.

4:00 PM - Continuation of the SWAP MEET.

6:00 PM - SOCIAL HOUR in the Museum Mezzanine Banquet Room.

6:30 PM - BANQUET AND OLD EQUIPMENT CONTEST AWARDS. Entertainment.

AWA MEMBERS AND IHRS MEMBERS AND THEIR GUESTS ARE MOST WELCOME!

FOR INFORMATION AND COMPLETE PROGRAM, WRITE TO:

Eric vonGrimmenstein - Chairman
9318 Seascape Drive
Indianpolis, Indiana 46250
317/849-0563

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Antique Cylinder & Disc Phonographs
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Parts and Pieces

EDISON
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Phone: (919) 492-0518

— MEMBER —
Michigan Antique Phonograph Society
California Antique Phonograph Society
Canadian Antique Phonograph Society
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flea market

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card ads $1.00
Space per square
inch $0.60

CLASSIFIED ADS .. 15 cents a word.
(first 20 words free)
PHOTO ADS ..... $5.00 extra.

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"FREE FOR LATEST FLYER, NO: 186D, SEND 2 STAMP S.A.S.E. TO: OLDE TYME RADIO COMPANY, 2445 LYTTONS- VILLE, MD 20910.

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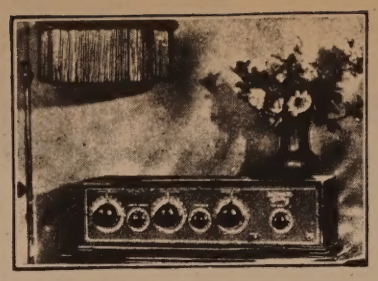
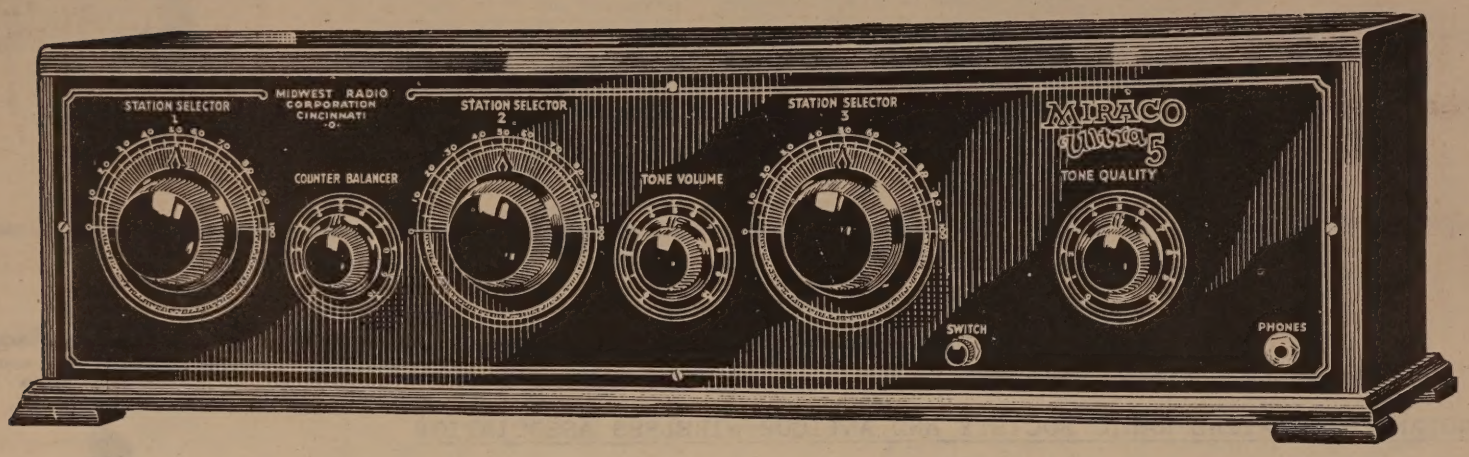
ANTIQUE BEEHIVE WHITE INSULATORS -

(Continued on page 8)

MIRACO 1926



Ultra 5
FIVE TUBE



SOCIAL EVENTS

ARCA

For further information:

Bill Denk (215) 688-2976
Rod Phillips (215) 667-8400
Joe Koester (301) 725-4229

The Antique Radio Club of America (ARCA) will hold its 15th Annual National Convention June 10-13, 1987 in suburban Washington, DC. The public is cordially invited to attend this 4-day event.

ARCA is a non-profit organization with nearly a thousand members who collect and restore vintage wireless and radio equipment, and who research and document the history of communications and broadcasting. Their scope of interest ranges from the late 1800's to the early development of television. Among ARCA's membership are pioneers in technology, radio & TV entertainers, industry executives, Amateur Radio operators and antique collectors.

This year's Convention will be held at the Sheraton Hotel and Exhibition Center on Route 450 in New Carrollton, Maryland... 10 miles northeast of Washington, DC, off Exit 20B of the I-495 Capital Beltway.

Featured will be guest speakers, symposiums, tours of area radio collections, a Saturday evening banquet, a large flea market and an auction of early radio and TV sets, books, magazines and broadcasting memorabilia. The proximity to the Nation's Capital will provide the opportunity for family trips to points of interest in Washington.

Organizers of this year's ARCA Convention are the Mid-Atlantic Antique Radio Club officers, whose headquarters are in Laurel, Maryland.

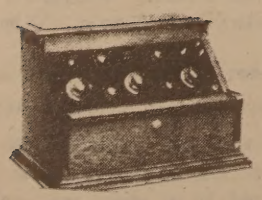
Membership information can be obtained by writing to ARCA, 81 Steeplechase Road, Devon, Pennsylvania 19333.

TRADE NAME: "Peak of Perfection."
TYPE: Super-reflex with built-in loud speaker.
TUBES: Four 199 type.
BATTERIES: Dry cell "A" and "B."
CONTROLS: Three.
AERIAL: Outside.
PRICE: $124.00 without accessories.
MANUFACTURER'S NAME: Parkin Mfg. Company.

TRADE NAME: "Pliodyne."
MODEL: 6.
TYPE: Two stages tuned radio frequency, detector and three stages of audio frequency amplification.
TUBES: Six.
BATTERIES: "A," "B" and "C" needed.
CONTROLS: Three.
AERIAL: Outdoor, indoor.
PRICE: $60.00 without accessories.
MANUFACTURER'S NAME: Golden-Leutz, Inc.

TRADE NAME: Pocket Radio.
MODEL: Standard B.
TYPE: Non-regenerative.
TUBES: One UV-199.
BATTERIES: Dry cells.
CONTROLS: One.
AERIAL: Indoor and outdoor.
PRICE: $23.50 without accessories.
MANUFACTURER'S NAME: Auto Indicator Co.

TRADE NAME: "Portola."
TYPE: Two radio, detector and two audio with built-in loud speaker and loop antenna.
TUBES: Six 199 type.
BATTERIES: Dry cell "A" and "B."
CONTROLS: Two.
AERIAL: Built-in loop.
PRICE: $160.00 without accessories.
MANUFACTURER'S NAME: Portola Radio Company.



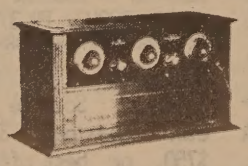
TRADE NAME: "Precel Super 5."
TYPE: Two stages of tuned radio frequency amplification, detector and two stages of power audio frequency amplification.
TUBES: Five.
BATTERIES: Space provided in cabinet.
CONTROLS: Three.
AERIAL: Indoor or outdoor.
PRICE: $130.00 without accessories.
MANUFACTURER'S NAME: Precel Radio Mfg. Co.

TRADE NAME: Premco Radio Receiver.
MODEL: 102.
TYPE: Tuned radio frequency circuit.
TUBES: Five.
BATTERIES: Not furnished.
CONTROLS: Three.
AERIAL: Outdoor and indoor.
PRICE: $60.00.
MANUFACTURER'S NAME: Ports Manufacturing Co.

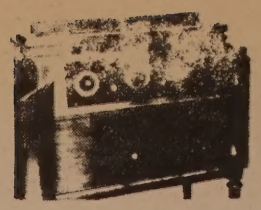
TRADE NAME: "Radak."
MODEL: DD.
TYPE: Armstrong regenerative double variometer type.
TUBES: Three.
BATTERIES: Not furnished.
CONTROLS: Two.
AERIAL: Outdoor.
PRICE: $38.00 without accessories.
MANUFACTURER'S NAME: Clapp Eastham Company.

TRADE NAME: "Radiodyne."
MODEL: W. C.-14-A.
TYPE: Two radio, detector and two audio.
TUBES: Four 201-A type.
BATTERIES: 6-volt storage "A," 90-volt "B."
CONTROLS: Three.
AERIAL: Outside.
PRICE: $65.00 without accessories.
MANUFACTURER'S NAME: Western Coil and Electrical Company.

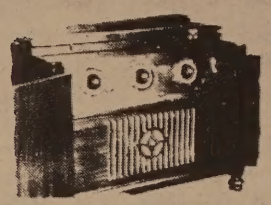
TRADE NAME: "Radiodyne."
MODEL: W. C.-12-B.
TYPE: Two radio, detector and three audio.
TUBES: Six.
BATTERIES: "A," "B" and "C" needed.
CONTROLS: Three.
AERIAL: Inside, outside or lamp socket.
PRICE: $150.00 without accessories.
MANUFACTURER'S NAME: Western Coil and Electrical Company.



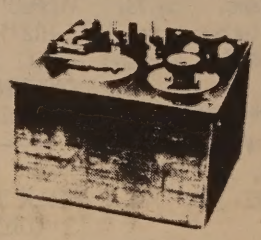
TRADE NAME: "Radiodyne."
MODEL: W. C.-11-B.
TYPE: Three-stage radio, detector and two audio.
TUBES: Six.
BATTERIES: "A" and "B" needed.
CONTROLS: Three.
AERIAL: Outside or inside.
PRICE: $150.00 without accessories.
MANUFACTURER'S NAME: Western Coil and Electrical Company.



TRADE NAME: "Radiodyne."
MODEL: W. C.-12.
TYPE: Two radio, detector and three audio, built-in loud speaker.
TUBES: Six UV-199.
BATTERIES: Dry cell "A" and "B."
CONTROLS: Three.
AERIAL: Outside or inside.
PRICE: $250.00 without accessories.
MANUFACTURER'S NAME: Western Coil and Electrical Company.

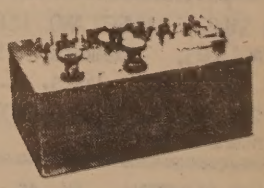


TRADE NAME: "Radiodyne."
MODEL: W. C.-11 Consolette.
TYPE: Three radio, detector and two audio, with built-in loud speaker.
TUBES: Six UV-201A.
BATTERIES: 6-volt storage "A," 90-volt "B."
CONTROLS: Three.
AERIAL: Inside, outside or lamp socket.
PRICE: $250.00 without accessories.
MANUFACTURER'S NAME: Western Coil and Electrical Company.

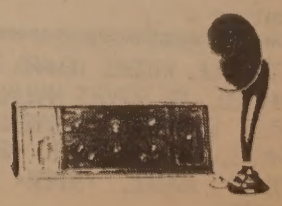


TRADE NAME: "Radiola Receiver."
MODEL: Radiola III.
Type: Regenerative.
TUBES: Two WD-11.
BATTERIES: Dry Cell.
CONTROLS: Two.
AERIAL: Indoor or outdoor.
PRICE: $35.00 without accessories.
MANUFACTURER'S NAME: Radio Corp. of America.

TRADE NAME: "Radiola Receiver."
MODEL: Radiola III-A.
TYPE: Regenerative
TUBES: Four WD-11
BATTERIES: Dry cells.
CONTROLS: Two.
AERIAL: Outdoor or indoor.
PRICE: $65.00 with tubes and head set.
MANUFACTURER'S NAME: Radio Corp of America.



TRADE NAME: "Radiola Receiver."
MODEL: Regenoflex.
TYPE: Reflex.
TUBES: Four WD-11.
BATTERIES: Not furnished.
CONTROLS: Three.
AERIAL: Outdoor or indoor.
PRICE: $191.00 with tubes and radiola loud speaker.
MANUFACTURER'S NAME: Radio Corp. of America.



$1.00 EACH —— HEAVY DUTY T.V. REPLACEMENT TRANSFORMERS, NEW BOXED AT $20.00 EACH. —— 50 YEAR COLLECTION OF VACUUM TUBES LOW LOW PRICES. INQUIRE M. LEVY, 101 EAST DRIFTWOOD #44, FBG, TX 78624 TEL. (512) 997-2534.

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FOR SALE. SERVICE DATA, PARTS, TUBES, TEST EQUIPMENT. LIST #2-86. SASE. KRANTZ, 100 OSAGE AVENUE, SOMERDALE, NJ 08083.

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ACME 'ACMEFLEX' (1925, VG TO EXC, UNTRIED, BOTH AUDIOS OK) $75 —— PHILCO 43B (1932, EXP REF'D, WORKS) $190 —— PHILCO 70B (1931, NICELY REFINISHED, SMALL VENEER PATCH ON THE TOP REAR OF CABINET, WORKS) $190 —— BULB SHAPED TUBES AND RADIO BOOKS ——— SEND LARGE 2 STAMP S.A.S.E. FOR COMPLETE AND UP-TO- DATE PHOTO LIST. ——— RON BOUCHER, 376 CILLEY ROAD, MANCHESTER, NH 03103. (603) 669-1698.

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CRYSTAL, TUBE EXPERIMENTER'S catalog - $1.00 - None free. Sets, kits, handbooks, plans, coils, supplies, obsolete tube quotations. Laboratories, 1477-H, Garden Grove, CA 92642.

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FOR SALE— UNUSED AND USED TUBES, CAPACITORS, speakers, etc. Send S.A.S.E. for lists. C. Elmer Nelson, 11 S. Church St., Princeton, IL 61356.

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PHILCO CATHEDRAL, AK 46, RADIOLA AR812, Radiola 18, Crosley Showbox, CASE, RCA T62, speaker AK-F4, quack home diathermy machine, B & K tube tester, wood cased test equipment, John Kendall, 600 Remington Road, Fallston, MD 21047. SASE for pictures and more information.

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FOR SALE. RIDERS, HOWARD SAMS, RCA, PHILCO, GE SERVICE MANUALS. TUBES, TEST EQUIPMENT, SPEAKERS, KNOBS, PARTS. SASE FOR LIST. KRANTZ, 100 OSAGE AVENUE, SOMER- DALE, NJ 08083.

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TRANSFORMERS— POWER— HEAVY DUTY— T.V. AND RADIO REPLACEMENT TYPES, STANCOR AND MERIT, NEW BOXED AT $20.00 EACH. LARGE COLLECTION VACUUM TUBES, LOW, LOW, PRICES. INQUIRE M. LEVY, 101 EAST DRIFTWOOD #44, FBG, TX 78624, TEL. (512) 997-2534.

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CHASSIS——— RCA 88K, 8 TUBES, EYES, CLOCK- TYPE DIAL, 3 BANDS, SPEAKER, SOME RUST, $30.00 —— PHILCO 112, 11 TUBES, $30.00 —— MOTOROLA HS-253, 8 TUBES, AM-FM, LOOP $20.00 —— RADIOS ——— AK-33, E3 SPEAKER $60.00 —— ZENITH 5R303, 5 TUBE AC, WOOD, PUSHBUTTONS $20.00 —— PHILCO E-812-124 YELLOW PLASTIC, 5 TUBE, AC/DC $15.00 —— SETCHEL - CARLSON 49-6, PAY RADIO, LESS COIN MECHANISM, 5 TUBE AC/DC $15.00 ——— COMMUNICATION RECEIVERS —— NATIONAL HRO-W, 5 COILS, POWER SUPPLY $60.00 —— HRO 5TAI, 3 COILS, POWER SUPPLY $40.00 —— NC-183D SPEAKER $60.00 —— HALLICRAFTERS SX-28, CABINET (NO CHROME) $60.00 —— HEATHKIT AR-3 $15.00 —— HEATHKIT HR-1680, SPEAKER $30.00 ——— TEST EQUIPMENT —— RIDER CHANALYST, PROBES, MANUAL $40.00 —— PRECISION E-200-C GENERATOR, MANUAL $20.00 ———— ALL COMPLETE WITH TUBES, SHIPPING EXTRA. JOE WATSON, 3300 ARROWHEAD CIRCLE, ROUND ROCK, TX 78681 (512) 255-7962.

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FOR SALE: TEST EQUIPMENT for radio and telephone. SASE for TE list. Serge Krauss, 141 Homan Avenue, Elkhart, IN 46516.

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FOR SALE: RADIOS, PHILCOS & RCA cathedrals, Kennedy, Radiolas, Atwater Kents, King and others. No. 199 radio tubes and others. Clifford Schoen, 549 Fulton Street, Seymour, WI 54165. Phone (414) 833-2429.

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FOR SALE 20 SW SETS— LIST SW87. PARTS, TUBES, SERVICE DATA, TEST EQUIPMENT, SASE FOR LIST E86, HARD TO GET TUBES, AK BB PARTS, TUBE SAGA, RADIO NEWS 1920 - 1945. SASE FOR LIST # OFFER 1987. PLUS MORE. KRANTZ, 100 OSAGE AVENUE, SOMERDALE, NJ 08083.

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LONG ISLAND ANTIQUE RADIOS— For sale and repair. All prices. Reasonable, come to AA Electronics, 178 I, W. Willets Road, Albertson, NY; 11542 at Albertson R. R. Station. Call first, (516) 741-4212.

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CONSOLES— 10 NICE RADIOS FOR SALE. PHILCO, RADIOLA, MARSHALL, MAJESTIC, KELLOG —— SASE FOR LIST. RUSS OLMSTED, 608 W. THOMPSON LANE, MURFREESBORO, TN 37130.

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RADIO RELATED TIE CLASPS, LAPEL PINS, R.C.A. - G.E.- PHILCO, ETC. FULL ENAMEL EMBLEMS. SEND S.A.S.E. FOR LIST. YOU WILL BE GLAD YOU DID. MR. MICHAEL S. SABODISH, SR., 11-A MATAWAN AVENUE, CLIFFWOOD, NJ 07721.

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INDIANA HISTORICAL RADIO SOCIETY information and membership application send SASE to: IHRS, 245 N. Oakland Avenue, Indianapolis, IN 46201

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FOR SALE: PHILCO 87. ZENITH 10S160. Silvertone R101. Crosley fiver. Crosley 515. Airline "Movie Dial" and others. List. WOIAZ, P. O. Box 141, Goodman, MO 64843. (417) 364-7936.

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COLLECTION OF Radio, Popular Science, Science and Invention, etc. magazines, 320 in all for $750. or best offer; 81 antique radio tubes for $225. or best offer, Emerson and Sentiel TV's $125. each. Large number of antique radios and phonographs for sale. Call Charles Rakes at (501) 273-5340 or send a large SASE for list of items for sale to: Charles Rakes, P. O. Box 445, Bentonville, AR 72712.

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RCA CT-100, fully restored 1954 COLOR TV, Bill Russell, 3236 Laurel Canyon, Santa Barbara, CA 93105. (805) 682-8115. Send $1.00 and SASE for color picture.

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FOR SALE; UNUSED AND USED TUBES, capacitors, speakers, etc. Send SASE for lists. C. Elmer Nelson, 11 S. Church Street, Princeton, IL 61356.

****

RARE FIND— TAKING BIDS— TWO C. R. LEUTZ SUPER DX SEVEN — SUPER DX EIGHT — TYPE L SER. NO. 518— LONG ISLAND NY PROTOTYPES — EVERETT BERRY, C/O - 2008 E. SEWARD STREET, TAMPA, FL 33604.

****

FOR SALE OR TRADE: CBS 190 COLOR SET 1953 uses 15GP22 in excellent original working condition.. Altec Lansing 230B mixing console near mint with original Altec book. Also have many 20's battery sets and horns. See wanted ad this issue. Ward Kremer, 301 SW 16st., Ft. Laud., Fl 33315. (305) 772-1608.

****

FOR SALE: BOOKS, MANUALS, Tubes from 1930's to 1970's at 75 cents each. SASE for lists. Bruce Harbeck, 13408 Westwood Lane, Omaha, NE 68144. Phone (402) 333-9013.

****

RADIO! RADIO! Jonathan Hill has published the most complete book on British radios from Marconi to the 1960's. Almost 1000 photographs illustrate the 242 page 8 1/2" x 12" book. Cost: $19.95 paperback, $29.95 hardback, plus $2.50 P&H. Howard Stone, 2825 6th Avenue, Fort Worth, TX 76110.

****

AVAILABLE: DUPLEX PHONOGRAPH, $4000/BO. Proposed deals involving pre-war TV's will receive priority. Jim Clark, 1 (517) 323-9595.

****

FOR SALE: OLD QST AND ARRL RADIO HANDBOOKS. SEND SASE FOR LIST. K. M. MILLER, K6IR, 16904 GEORGE WASHINGTON DRIVE, ROCKVILLE, MD 20853.

****

HIGH FIDELITY magazine, 1940s; MUSIC AT HOME, AUDIOCRAFT magazines; old RCA theremin, early oddball hi-fi stuff. Have trade items. Hal Layer, P.O. Box 27116, San Francisco, CA 94127.

****

CAPEHART 112N2 has unusual record changer- $325; Neutrowound Super 6 - $185; Zenith 6S229 - $85; AK-20 - $75; and others. Rosenthal, 507 South Maryland Avenue, Wilm., DE 19804.

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**********SPECIAL**********

We will run your ad until you sell your merchandise through June 1987. Please notify us when you sell so that we can cancel your ad. If you want only to run only as you specified, we will run it only that number of times. Thank you.

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BROWNING DRAKE KIT $65.00, (no case) A K E speaker $25.00, Sonochorde spkr (fair) $20.00, Philco

16 cathedral $175.00, Philco 650 (refin) $65.00, SHIPPING EXTRA. Richard Foster, 12 Shawmut avenue, Cochituate, MA 01778. (617) 655-2056.

****

WESTINGHOUSE CONSOLE MODEL WR7, depression era 1929-1930. Built- in phono and record cutter/ recorder w/ original hand mike, manual and dealer's documents. Great condition - it works! pick up only $250.00. Frank, K2RLG, 117 Cathedral Avenue, Florham Park, NJ 07932.

****

SELL: FOUR CATHEDRALS: RCA 18, AK 47, Crosley 51S, speaker RCA cabinet #104, Music Master gooseneck 12 inch bell. All complete, refinished and operating. Phone (904) 683-7202. Charles Kaelber, P. O. Box 3335, Spring Hill, FL 33526.

****

FOR SALE: ABOUT 150 differernt SAMs sets, most complete at 25 cents each or offer for all and postage. Radio and TV tubes from 30s to 70s, 25 cents to $2.00 each. NOS and used. SASE, Craig Larson, 2122 45th Avenue, Minneapolis, MN 55421.

****

PHILCO PHANS: unusual chairside "BAR RADIO" with swing out bar has Philco model 38-10 chassis (5 tubes) $50.00. Philco 112 chassis (11 tubes) $30.00. Motorola HS-253 chassis (8 tubes), AM-FM, loop $20.00. COMMUNICATIONS RECEIVERS: National NC-183D, speaker $60.00, Hallicrafter SX-28, cabinet, no chrome $60.00. Heathkit HR-1680, speaker $25.00. Joe Watson, 3300 Arrowhead Circle, Round rock, TX 78681. (512) 255-7962.

****

FOR SALE: UNUSED AND USED TUBES, capacitors, speakers, etc., send SASE for lists. C. Elmer Nelson, 11 S. Church street, Princeton, IL 61356.

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FOR SALE:: KENNEDY MODEL 5 $199.00, Hallicrafter 7" TV $149.00, Air Service (Rambler) that uses 199 tubes - $79.00, Atwater Kent model 52 - $59.00. Stan Jacobs, 232 Highbrook Avenue, Pelham, NY 10803. (914) 738-3483.

****

FOR SALE: "B" POWER SUPPLY for RCA model 18 R.C.A. tube manual - complete 1950. Sylvania tube manual - good - 1956. Heathkit tube test equipment from 40's - like new and manuals. Chas. Kaelber, P. O. Box 3335, Spring Hill, FL 33526.

****

FOR SALE: SILVER COCKADAY receiver $90.00, Radiola 17 & 18 $50.00 each, GGH Bakelite Horn (Mint) $90.00, Newcomb-Halley drum speaker $40.00, Arbocone speaker (mint) $45.00 and other cathedrals, horns, tubes, AC sets, Rider manuals, parts and literature. Send SASE for upcoming list. Fireside Wireless, 1507 Ridge Avenue, New Castle, PA 16101. (412) 654-9335.

****

FOR SALE N.O.S. TUBES IN ORIGINAL BOXES NAME BRANDS. 6AWA 6X5 6SA7 6SF5 12SK7 12SQ7 25L6 50A5 may be met. g. or gt. mix or match. 12 for $15.00 P.Pd. in the 48. ———— R.C.A. WT110a tube tester with between 400 and 500 cards also master card, a few blank cards and puncher for making additional cards, and owners manual. This is the automatic tester you drop in the card instead of using a tube chart. It test 7, 9, pin octal and loktal tubes in good working order. $50.00 plus shipping for 30 pounds. SASE for parts list. C. F. England, 98 Montague Avenue, South Zanesville, OH 43701.

****

BEAUTIFUL, COLORFUL, ENAMEL radio-related tie clasps and label pins with emblems of Philco, G. E., R.C.A. and others. Must see to appreciated. Send a L.S.A.S.E. for completely illustrated list. Mr. Michael S. Sabodish Sr., 11-A Matawan Avenue, Cliffwood, NJ 07721.

****

SWAP - OLD RADIOS, TUBES, LIT., FOR OLD FIDDLES AND OR FIDDLE PARTS, CASES. NEED LID FOR AERIOLA SR MADE BY WESTINGHOUSE. CECIL BOUNDS, STAR RTE. 1, BOX 420, CARLSBAD, NM 98220. (505) 785-2363.

****

CONSOLES FOR SALE: ATWATER KENT model 70 $95.00, SCOTT PHANTOM 19 $195.00 both in good operating condition. Chrome on Scott chassis is dull. Pick-up only. Ross Smith, 1133 Strong Avenue, Elkhart, IN 46514.

****

OVER 100 AUTO RADIOS, most are tube type, as is, $15.00 to $50.00, restored to $100.00, list for SASE. Test equipment for SASE. Interested in buying Carter Genemotor, James Fred, Cutler, IN 46920.

****

SELL / TRADE: AK-60/ KIEL TABLE —— TRADE: AK-92, VICTOR 9-15, Bob Nicholson, 3423 Long, Topeka, KS 66605.

****

CROSLEY 51 $65.00 — CROSLEY 52 $85.00 — Ace type 5 $175.00 — Neutrowound $225.00 — Chelsea ZR4 $175.00 — Overland 1 tube $130.00 — Lambert xtal set $165.00 — Patrick Henry xtal set $85.00 — Wemco xtal set $220.00 — Vogue microphone in box $40.00 — Philmore microphone in box $25.00 — and fancy chrome hand mike $75.00 ——— Anthony Caserta, 47 Vista Lane, Levittown, NY 11756.

****

THORARDSON YOKES AND FLYWHEELS- 2 thru 167 $15.00 each. postpaid, Don Aldred, 39 East Eighth Street, Jacksonville, FL 32206.

****

(1) 01A TRIPLE SOCKET for panel or base. 1 new Erla single socket, other bases, bases for 199. Russell Schoen, E 7340 Nietzhe Road, Clintonville, WI 54929.

****

CRYSTAL RADIO BLACKBIRD $175; ANIMATED SMALL VICTOR CLOCK WINDUP MINT CONDITION $165; RARE TERPOPHONE COLLAPS. PHONO $165; TRADES CONSIDERED. PAYMENT BY U.S. POSTAL MONEY ORDER ONLY. SHIPPING INSURANCE FREE. —— S. LEONARD, BOX 127, ALBERTSON, L.I. NY 11507. TEL. (516) 742-0979 8 AM OR 5 PM E.S.T.

****

NATIONAL HIGH FREQUENCY RECEIVER TYPE HRO-STA-1 WITH FOUR COILS. ASTATIC MIKE MODEL D104-B832121 697 NATIONAL POWER SUPPLY. NATIONAL SPEAKER W/8" JENSEN SPEAKER. QST'S 1929 TO 1943, OK CONDITION. GONSET REC-TRANS- PA WITH TUNING EYE AND SWITCH FOR TRIPLER WITH XTAL MEISNER DELUX SIGNAL SHIFTER— ABOVE UNITS WERE USED ALL TOGETHER. AND NICE CONDITION OHMITE DUAL SCALE RESISTANCE INDICATOR. FROST FONES NO 172. HOWARD MODEL 430 UNIT ELECTRICALLY OK BUT NEEDS CASE. RESTORATION.. 2-3JP1, 2-3BP1 CR'S.

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Motorola	1926-50	☐ SM-7	14
Emerson	1926-50	☐ SM-8	10
Stewart-Warner	1926-50	☐ SM-9	8
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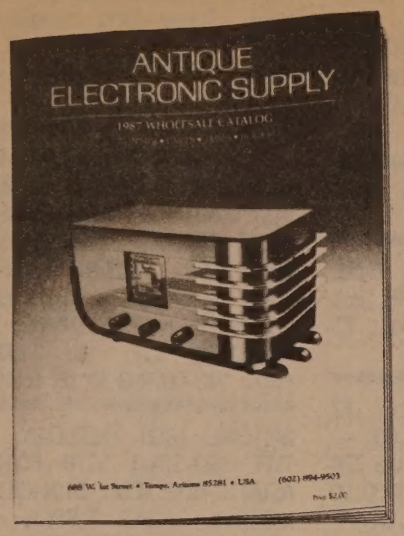

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FOR SALE: 3 PAGE LIST OF battery and A C radios. Send large S A S E stamped envelope. Donald Juleen, 6252 Ledge Road, Sturgeon Bay, WI 54235. Phone 1-414-743-7922.

****

FREE —— FOR NEWLY ISSUED FLYER, no. 187. Send 2 stamp SASE to: Olde Tyme Radio Company, 2445 Lyttonsville Road, Silver Spring, MD 20910.

****

FOR SALE: GOOD USED RADIO TUBES. Have a good supply in stock. 24A's-$1.25, 27's-$1.00, 39/44's-75 cents, 41's-$1.25, 42's-$1,25, 43's-$1.25, 56's-75 cents, 57's-75 cents, 75's-75 cents, 76's- 75 cents, 77's-75 cents, 78's-75 cents, 80's-$1.75, 84/6Z4- 50 cents, 2A3'-$2.50, 5Z3's- 50 cents, 6A7's-50 cents, 6C6's-75 cents, 6D6's-50 cents, 12Z3's-75 cents—— Plus postage. LASE for list. H. Fothe, 10 Jackson Street, Sloatsberg, NY 10974.

****

SPARK TRANSMITTER - "one KW" from early parts, Thordarson Type R spark transformer, old flat ribbon oscillation transformer, beautiful composite rotary gap with old motor. Used for lectures and display. Phone for description. $500 firm; DeForest loop antenna, nice $60; Very accurate replica Clapp Eastham navy type loose coupler. $90. All plus UPS. Paul C. Crum, W9LC, 6272 N, Cicero Avenue, Chicago, Illinois 60646. (312) 282-3033.

****

FOR SALE. GERMAN MADE RADIO — A K model 70, 1927, mint, plug in coil's. ? —— Russell Schoen, E. 73.40. Nietkze Road, Clintonville, WI 54929.

****

WANTED

NOTICE

SPRING SPECIAL — through June 1987 please specify on your ads if you want to run them until you find the item and notify us when you do (limit 6 months or less). If not, please specify the limit on the number of months you want the ad to run before all the readers of THE HORN SPEAKER.

WANTED HALLICRAFTER SX-71 OR NATIONAL NC-183 in excellent condition. Please state price and condition when corressponding. Roy Schmitt, Rt. 1, Box 800 Lot 84, Converse TX 78109 (512) 659-0094.

WANTED: B-ELIMINATOR, O1A tubes; quote prices, specifications. T. C. Day, 215 West 7th Street, St Waynesboro, PA 17268.

TELEVISIONS BOUGHT! Buying 12" and smaller pre 1950 sets, plus Predictas, early color, etc. Paying $40- 350. Buying pre- WW II TV's- TRK's, Dumont, TT5's, Fadas, more. Paying $1200- 4000! Books, TV novelties- wanted. Harry Poster, Box 1883, So. Hack., NJ 07606 (201) 794-9606.

WANTED: DISK CUTTING EQUIPMENT, Rek-O-Kut, Presto, Meumann, etc. Also need idler wheel or measurements for Federal PR-12 disc cutter. Old pro mikes RCA 44's, 66's, AKG, etc. Ward Kremer, 301 SW 16st., FT. Laud., FL 33315, (305) 772-1608.

WANTED: DUMONT TELEVISION, table model with continuous tuning and FM. Jack Kashak, 139 E. Saemann, Chesterton, IN 46304. (219) 926-7240.

WANTED: EDISONIC D. D. REPRODUCER. Edison antique finish dance reproducer — picture records — record dusters —— Contact: Jimmie Grissom, 246 Keene Street, Henderson, NC 27536.

WANTED: CABINET TOPS FOR RADIOLA 20 or 25 and 104 speaker unit. DeForest tubes and cans, early tubes and light bulbs. Bruce Harbeck, 13408 Westwood Lane, Omaha, NE 68144. (402) 333-9013.

WANTED: WOOD FRONT PANELS for Radiola 20, large tuning knobs for A.K. 35. Mark Oppat, 167 Caster, Plymouth, MI 48170.

S.A.S.E. is a self addressed stamped envelope.

WANTED COAXIAL OR TRIAXIAL SPEAKERS of Jensen, Trusonic, Tannoy, Altec 604's. Western Electric equipment (tubes, amps., drivers, horns, speakers, microphones and parts). Radio tubes (50's, 211, 845, 8005) David Yo, P. O. Box 832, Monterey Park, CA 91754. Tel. (818) 576-2642.

CATHEDRAL RADIOS, MUST BE NICE AND WORKING CONDITION. WILL PAY TOP DOLLAR. ALSO WANT OTHER UNUSUAL AC RADIOS. HAROLD PERKINS, 4468 SUN VALLEY DRIVE, LAS VEGAS, NV 89121.

WANTED —— RCA CREDENZA'S, Edison windups - speaker systems and components, JBL Hartfield, Paragons- Altec Laguna, Magnificent, 515A/B, 288B/C, 604B/C/D/E, E.V. Patricians, Tannoy Autograph, GRF - Red/ Silver/ Gold, Jensen G610, Western Electric theatre equipment, speakers, drivers, horns, electron tubes, mixers, x-formers, x-overs, tubes, round top 45, 50 - W.E. 252A, 300A/B, 350B, etc. Charles Dripps, 4331 Maxson Road, El Monte, CA 91732. (818) 444-7079.

WANTED —— GRANDFATHER CLOCK RADIO and Radiola IV. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, CAnada, T6H 0H9

WANTED— OLD 1960s or 70s large Allied Radio Catalogs. Earl Phillips, 311 David Lane, Maryville, TN 37801.

WANTED: BOOKS; buy, beg, borrow, rent or steal. Twining, "Wireless Telegraphy and High Frequency Electricity;" Curtis, "Construction of Induction Coils & Transformers;" Collins, "The Amateur Electrician's Handbook;" and other books with Tesla coil projects. Need data for forthcoming bibliography. TCBA, RD 3, Box 181, Glens Falls, NY (518) 792-1003.

WANTED- INSTRUCTIONS FOR OPERATING Hickock tube tester model # 600-A plus supplement tube data sheets. Zerox copies OK. Frank Hoffert, 19605 Chardon road, Cleveland, OH 44117. Tel. (216) 481-0226.

WANTED— OLD 1960s or 70s large Allied Radio Catalogs. Earl Phillips, 311 David Lane, Maryville, TN 37801.

URGENT— URGENT—— NEED PART FOR VOLUME CONTROL FOR AK BREADBOARD MODEL 10. STRIP THAT HAS WIRE WOUND ON INSIDE OF CONTROL. RUSS SCHOEN, R#1, CLINTONVILLE, WI 54929.

WANTED: INFORMATION OR EQUIVALENT CHARTS ON MUTER BRAND BALLAST TUBES. OLD CATALOGS MAY LIST THEM. ANTHONY JACOBI, 8053 MAYWOOD, RALSTON, NE 68127.

WANTED - New or used OA2 voltage regulator tubes. Need 1200, must be reasonable. Tom Burgess, Box 9769, Little Rock, AR 72219 - (501) 565-1750 evenings.

WANTED: GRANDFATHER CLOCK RADIO, AK, Philco, etc. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta Canada T6H 0H9.

RADIOLA Balanced amplifier— RADIOLA IIIA. whole—— parts—— junk. State price and condition when corresponding. B. Block, 2118 Winn, Kemah, TX 77565.

RADIOLA ITEMS WANTED: Vocarola, RE, AR, Concert Receiver; Radiola IV, VI, VIIB / IX grand; any of AA series. CASH OR TRADES. Rosenthal, 507 South Maryland Avenue, Wilmington, DE 19804

WANTED: SET OF RIDER MANUALS, Vol. 1 thru 8. Must be realistic price. Michael Sabodish, 11A Matawan Avenue, Cliffwood, NJ 07721. (201) 566-1486.

HR-3 RCA ELECTRON TUBE HANDBOOK. Industrial, receiving and trans-

mitting tube technical bulletins by GE, Sylvania, etc. Nick Tusa, K5EF, 129 Somerset, LaPlace, LA 70068 (504) 652-4904.

WANTED: LARGE HIGH VOLTAGE VARIABLE CAPACITOR. TCBA, RD 3, Box 181, Glens Falls, NY 12801

-WANTED: COLORFUL "CATALIN" plastic radios; Fada, Emerson, DeWald, Addison, etc. Top prices paid. Mint condition only. R. W. Oliver, 355 Highwood Avenue, Leonia NJ 07605 (201) 944-0777.

WANTED— ANY McMURDO SILVER ELECTRIC set with or without cabinet. Masterpiece I, II, III, IV, V, VI 14-15, 15-17. Any literature, McMURDO SILVER TIMES OR FORUM Magazines. Also 1935- 1939 Zenith consoles. We pickup most areas of U. S. and Canada. Frank and Mary Rasada, 12507 Pinegrove Lane, Cerritos, CA 90701. Days: (714) 951-9591. Evenings: (213) 926-6722, leave message for return call.

WANTED— INFORMATION / DATA on the "SHELDON RADIO COMPANY" that was active in Los Angeles 1925-1931. Ed Sheldon, 656 Gravilla Place, La Jolla, CA 92037.

WANTED: SILVERTONE MODEL 4500A, black plastic table model— only interested in cabinet. Tom Johnson, 215 E. 7th Street, Ames, IA 50010.

WANTED: INFORMATION ON PEERLESS wireless, Milo Bailey, Thomas E. Clark (TECLA), and any other pre 1930 Michigan manufacturers: brochures, ads, articles. photocopies ok. Tips welcomed. Oran Sauder, 316 Wellington, South Lyon, MI 48178. (313) 437-4413.

SPARK EQUIPMENT— Especially 25,000 volts Commercial Spark Condenser, Rotary gap or complete sets. Paul C. Crum, 6272 N. Cicero Avenue, Chicago, IL 60646. 1(312) 282-3033.

WANTED: RADIO CORRESPONDENCE course kits. AC or battery. Leo Teply, geddes, SD 57342.

WANTED: DON'T THROW AWAY THOSE ELECTROMECHANICAL POWER SUPPLIES AND PARTS 6 VOLT AND 12 VOLT VIBRATORS, OZ4's, TRANSFORMERS. CASH PAID OR TRADES. MARVIN ROTH, 14500 LaBELLE, OAK PARK, MI (313) 399-5993.

A GERMAN MADE RADIO. Small table model— working condition. Phone or write. PETERSONS, 3115 North 61st Street, Lincoln, NE 68507. (402) 466-7548.

HALLICRAFTERS SX-88, parts or junker. Gene Mottern, 313 Royal Drive, Kingsport, TN 37663.

WANTED: A.K. BREADBOARD PARTS; antenna coils, type 11 tuner coil-tube unit. detector unit, potentiometers. 3 tube detector amplifier unit, switches, highest prices paid. DeWitt L. Bills, 5237 Upton Avenue North, Minneapolis, MN 55430. (612) 521-7109.

WANTED: LARGE HIGH VOLTAGE variable capacitor. Books and magazines on electricity, medical electricity and wireless telegraphy. Want list available. TCBA, RD3, Box 181, Glens Falls, NY 12801.

WANTED: LID FOR RADIOLA 20 and ATWATER KENT 20C, power supply for U.S. Radio and Television model 80. Richard Peterson, 3940 Lolan Ct., Marrero, LA 70072.

WANTED— A COPY OF SCHEMATIC for portable radio. R.E. 8000 - Ross Electronics and Manual. Michael J. Doback, 592 Southlawn, Birmingham, MI 48009.

CHELSEA MODEL 102 AF transformer, working or not. Will buy junker set to get one. Transformer nameplate says Songbird Midgie. P. A. Kinzie, 713 E. Beale Street, Kingman, AZ 86401.

WANTED: FANCY LOOKING GRANDFATHER CLOCK RADIO. Also AK models 558, 217, 165, 246, 944. Also Radiola IX, Airline 20 and Philco 20B. Need dud WD11 tubes. Gordon Wilson, 11108-50 Avenue, Edmonton, Alberta, Canada T6H 0H9.

WANTED: SILVERTONE MODEL 4500A, black plastic table model— only interested in cabinet. Tom Johnson, 215 E. 7th Street, Ames, IA 50010.

WANTED: RADIOLA X CHASSIS FOR PARTS. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, Canada T6H 0H9.

TV's BOUGHT — NEED 10", 7", etc. — pre 1950+ Predictas, early color, paying $40 - $350. PRE- WAR TV's - TT5, TRK, LOTS MORE - $1200 - $4000. Books on TV's, pre 1948. Harry Poster, Box 1883H, So. Hack., NJ 07606. (201) 794-9606.

WANTED— WIRING CIRCUIT for RADIODYNE WD17- 5 tube radio, made, (Western Coil and Electric) Co., Racine, Wisconsin, a copy, a tracing or anything to get the wiring hookup. Herb DeGarmo, 203 3rd Street, Early, IA 50535.

WANTED: PHILCO 60 CHASSIS. Rheostat knob for a Crosley 51. Marc Ingenthron, 9215 W. 83rd Street, Overland Park, KS 66204.

WANTED: DRIVER AND METAL PARTS FOR MUSICMASTER HORN SPEAKER. HALLICRAFTER SX-17 AND SPEAKER. CHARLES FURTAK, 241 OAK, ELMHURST, IL 60126.

WANTED — DeForest Interpanel. Richard C. Foster, 12 Shawmut Avenue, Cochituate, MA 01778. (617) 655-2056.

WANTED: QST 1950-59 BOUND LIBRARY VOLUMES. ALSO MINT WRL GLOBE SCOUT (820). M. GRIMES, 3805 APPOMATTOX, PLANO, TX 75023. (214) 867-6373

WANTED TO BUY. A 1927 AC only Zenith table model radio. Must be in original condition, Cabinet also original finish. Will pay top price for a nice one. Thanks. Ron Burtzos, 915 Crane Drive, Apt. 703, DeKalb, IL 60115.

WANTED: ANY GREBE DETECTOR OR DETECTOR AMP AND GREBE CR-6 AND CR-7. JIM COLLINGS, 12005 VICTORIA PL., OKLAHOMA CITY, OK 73120

CASH OR TRADE OLD RADIOS, tubes, speakers, literature, etc. for old fiddles, bows, cases or parts. Cecil Bounds, Star Rte. 1, Box 420, Carlsbad, NM 88220. (505) 785-2363.

WANTED: 75P-4 CRT'S — FRED EMERSON, 627 ILLINOIS AVENUE, ELGIN, IL 60120

WANTED: NATIONAL HRO 60 coils: 15 meters (AC), 6 meters ((AD), E, F, G, H, J, others, dead or alive. Please write giving condition and price. Art W6ZNO, 18151 Rancho Street, Tarzana, CA 91356.

WANTED — GREBE CR18, HALLICRAFTER SX11, SX16 SKY CHIEF. RCA ACR 136, HOWARD 430. HT6 TRANSMITTER. K4UJZ, 608 W. THOMPSON LANE, MURFREESBORO, TN 37130 (615) 893-5344.

WANTED— CABINET FOR MY MADISON-MOORE RECEIVER. PANEL SIZE 7" X 26". MUST BE DEEP ENOUGH FOR A CHASSIS 10 1/2" DEEP. ALSO WANT CABINETS FOR RADIOLA II AND FOR ECHOPHONE V-3. DAVID McKENZIE, 516 SOUTH EXETER STREET, EUSTIS, FL 32726. (904) 589-0149.

WANTED: MAJESTIC 3 TUBE PORTABLE MODEL 130 - oak case for Supreme model 385 set tester, chassis for American Beauty radio. Delmer Woodley, RT. 3 Box 13, Milford, IA 51351.

RCA-103 SPEAKER with poor cloth grill or none. Must be in working condition. Contact - Ken Ericksen, 1049 Felspar #33, San Diego, CA 92109.

SCHEMATIC FOR CRESCENTYNE 5 tube T R F radio. Also need parts for Bremer-Tully Counterphase T R F radio. Arnold G. Schmidt, Rt. no. 5, Jamestown, ND 58401

AK-90, 558, 708 AK- breadboard parts, sell/ trade: AK-92, Victor 9-15, Bob Nicholson, 3423 Long, Topeka, KS 66605.

ZENITH 16A61. Will pay top dollar for very good to mint condition. Call or write. James E. Bragg, 14217 Runnymede, Van Nuys, CA 91405. (818) 787-6255.

WANTED— 1920 to 1939 radio's, working or not. Send condition, model and price. Johnnie's T.V., 476 Nordale Road, North Pole, AK 99705.

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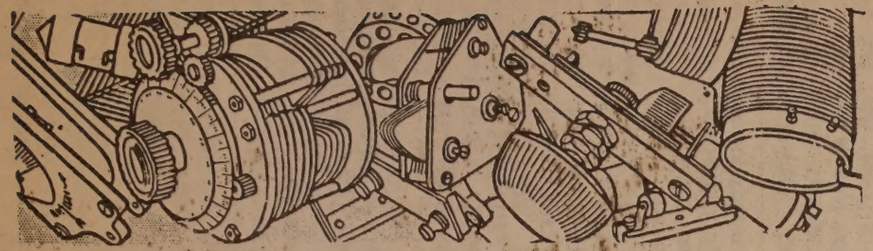

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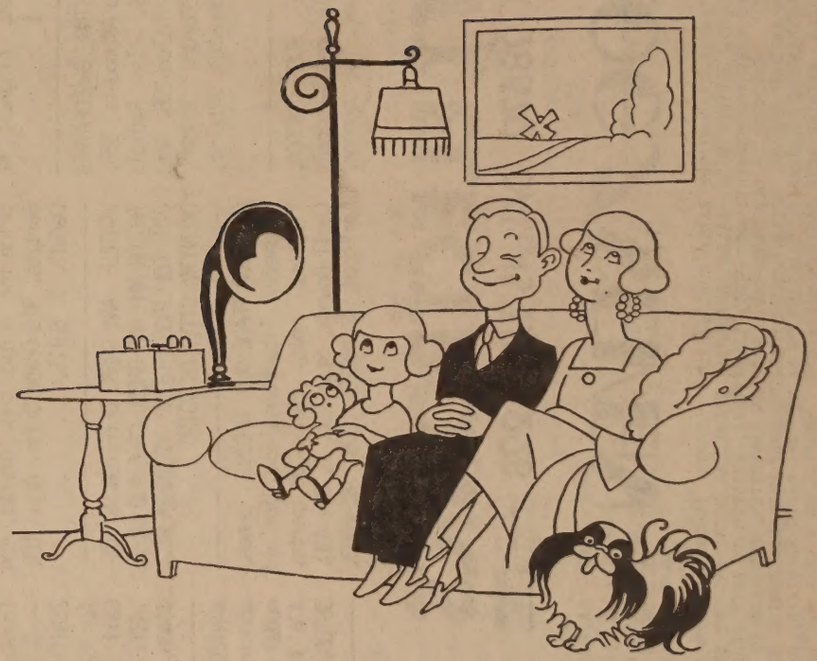

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